

I claim:

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1. A system for monitoring and responding to the environment of an implanted device comprising  
one or more sensors for monitoring data relating to variables selected from the group consisting of electrical, magnetic, mechanical, fluid flow, chemical, and thermal properties in the device or its environment in a patient, and  
monitoring and/or actuating means for implementing a response to the data in the device.
  2. The system of claim 1 which includes a data storage means.
  3. The system of claim 2 wherein the data storage means is on the device or contiguous to the device or within or on the body of the patient.
  4. The system of claim 1 which includes a telemetry means.
  5. The system of claim 4 wherein the telemetry means is an analog or digital electronic device.
  6. The system of claim 1 comprising means for communication to one of a series of nested loops of information exchange.
  7. The system of claim 1 comprising an external input connected through loops to effectuate change in the device from an actuator means.
  8. The system of claim 1 wherein the monitoring means is external to the patient.
  9. The system of claim 1 wherein the sensor detects changes in pH, temperature, ion concentration, or analyte concentration.
  10. The system of claim 1 wherein the sensor detects changes in temperature, dimension, vibration, turbulence, pressure, moisture, magnetism, electric potential, and electric current and mechanical or fluid flow properties.
  11. The system of claim 16 wherein the mechanical property is stress, strain, shear, flow rate, or pressure.
  12. The system of claim 1 wherein the sensor detects a change in placement of the device.

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13. The system of claim 1 wherein the actuating means is a micromachine that modifies the shape or position of the implant in response to a signal from a sensor.

14. The system of claim 1 wherein the device comprises a bioactive, diagnostic, or prophylactic agent or a pH modifying agent, which is released into the environment.

15. The system of claim 14 wherein the agent is released by diffusion.

16. The system of claim 15 wherein the rate of diffusion is increased by a change in a variable in the environment.

17. The system of claim 14 wherein the agent is released in response to a signal from a sensor.

18. The system of claim 14 wherein the actuating means releases agent mechanically by opening means for delivering or retaining the agent.

19. The system of claim 1 comprising transmitting and receiving means to the sensor.

20. The system of claim 1 wherein the monitoring means and actuating means are the same device.

21. An implantable sensor comprising data storage means.

22. The sensor of claim 21 further comprising means for remotely accessing the data.

23. The sensor of claim 21 wherein the sensor is connected to means for transmitting or receiving data from a computer or phone communication means.

24. The sensor of claim 1 or 21 wherein the sensor can be used to monitor alterations in concentration or distribution of cells or tissues or properties of the cells or tissue, changes in metabolic products, changes in antigenicity or cell surface expression, and the presence of foreign depositions including inorganic, organic and microbial materials.

25. The sensor of claim 1 or 21 wherein the sensor can be used to measure changes in weight.

26. The sensor of claim 1 or 21 wherein the sensor can be used to measure tissue fibrosis as changes in stiffness of a tendon, skin stiffness or muscle tension or rigidity.
27. The sensor of claim 1 or 21 wherein the sensor can be used to measure fouling of the device or sensor over time.
28. The sensor of claim 1 or 21 wherein the sensor can measure protein deposition or formation of a bacterial film on a biliary stent, increase in calcification of a urinary stent, and neointimal thickening of an arterial stent, resulting in an increase in thickness, mass and wall shear.
29. An implant comprising a bioactive, prophylactic, diagnostic or pH modifying agent wherein the implant is formed of a temperature or pH responsive material so that the agent is released when the temperature or pH is altered.
30. The system of claim 1 comprising:
- (a) one or more sensors for monitoring the general environment of the implant;
  - (b) monitoring means;
  - (c) actuating means for responding to the environment;
- wherein the sensors communicate information to the monitoring means and to each other, and wherein the sensors communicate commands to the actuating means.
31. The system of claim 30 wherein the sensors communicate information to a computer transmitting the information to another computer via the internet.
32. The system of claim 31 wherein the transmission over the internet to another computer is via a posting to the world wide web.
33. An implantable device comprising one or more sensors interacting with external monitoring and/or activating means and a computer.